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ABSTRACT

The total systems approach to guidance and counseling is an attempt to help the student understand the personality of the environmental systems in relation to his own personality. Such an approach would provide for integration of the two personalities leading to productive behavior and individual goal achievement. This objective can be approached by teaching the student how to become aware of himself as a "human system" in terms of "system logic". For the Bartlesville System (Total Guidance Information Support System) is proposed that game models be constructed to teach systems logic and concepts. By providing the student with a chance to experience concepts of importance in the economic world, the student has an opportunity to experience how his own personality might react. The gaming approach emphasizes the responsibility of the individual in constructing his personal value and moral system in relationship to his environment. The game development process is discussed. The report concludes with a description of various game models which can be used at various points within the system. (KJ)

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TECHNICAL MEMORANDUM 10

THE BARTLESVILLE SYSTEM

TOTAL GUIDANCE INFORMATION SUPPORT SYSTEM

DEVELOPED BY
THE BARTLESVILLE PUBLIC SCHOOLS
THE RESEARCH FOUNDATION
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THE BARTLESVILLE SYSTEM

TGISS - TM No. 10

GAMING FOR VOCATIONAL AWARENESS

A SYSTEMS APPROACH

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CG005075

GAMING FOR VOCATIONAL AWARENESS

A SYSTEMS APPROACH

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The search for a systems approach to all fields of science is an old and long search. The search has been extremely effective in the science of physics but has met with little success in the social and behavioral sciences. This is vividly emphasized today within the world community, by the fact that man possesses the power to destroy himself but has not as yet developed adequate ways to govern himself.

The world is presently embroiled in a social revolution. This makes it extremely important that man develop "systems" for handling change in an organized and constructive manner. People in the world at all levels of society are sounding the alarm and demanding a voice in their own determination. There is not only a need to understand man's individual behavior and goals, but there is a need for understanding the personality of the "systems" he has created.

The "total systems approach" to guidance and counseling is an attempt to not just merely provide the student with information and *obsolete direction*, but is an attempt to help him understand the personality of the environmental systems in relation to his own personality.

Such an approach would provide for integration of the two personalities leading to productive behavior and individual goal attainment. It would provide the individual with opportunities to learn how to participate in the environmental system and to bring about changes within the system which best meet the needs of the membership of the environment.

These objectives can be approached by teaching the student how to become aware of himself as a "human system" in terms of "systems logic." Emphasis may be placed upon teaching ways to utilize "environmental systems logic" to personify the integration of both self and environmental personalities into what might best be termed "a compatible systems relationship." More specifically, in terms of vocational jargon, "vocational concepts" that equip the student to meet his survival needs in an ever changing society.

Super,[1] outlines the elements of a theory of vocational development by listing the areas of conceptual development. He states that "adequate adjustment is most likely to result when the value of the work itself and the way of life that goes with it are congenial to the aptitude, interests, and values of the person in question." If the concepts held by the individual regarding his personality, environment, goals, interests and values are compatible with the concepts acceptable to the "environmental system," an adequate vocational adjustment is more likely to become a reality.

The problems associated with bringing about compatibility between individual and environmental concepts are many and very complex. An example might be the student's self-concept. It is vague and underdeveloped in the area of his personality, ability, interests, traits,

role development, role concept, decision-making skills and plans for change. The student lacks information pertinent to concepts related to his environment.

Such a problem is complicated by the complexities of the individual's environment. Educational methods centering around information giving are no longer adequate. In fact, many authorities fear that unless man learns the concept of "systems logic," society will not continue to survive. S. Benjamin Prasad[2] states, "think for a moment, if you will, of the institutions of our society that are in a state of management crisis. They would certainly include the following:

1. Agriculture, which suffers from over-expansion in some countries, archaic methods in others, and inflexibility in all;
2. Schools and colleges which are everywhere beset by acute problems of finance and organization precipitated by soaring enrollments and essential demands for better education;
3. Hospitals and medical care institutions, which in methods of support and operation lag far behind the accelerated revolution of the life sciences and their enormous potential benefits for mankind;
4. Railroads, which in many instances appear to have stalled some decades ago in states with severely arrested economic and technological development;
5. Municipalities, which confront runaway problems with mazes of illogically tangled authorities;

6. State and federal branches of government whose vastly expanded administrative functions reflect historical and political circumstances far more than effective organization to serve public needs;
7. Businesses, which are perilously ignorant of conditions decisive for their futures, and especially those businesses that have invested heavily in defense capability which cannot be readily converted to production for civilian markets; and
8. Labor unions and educational institutions which often times seem short-sighted in facing what they might capitalize on as the great promise of advancing automation.

Each of these various types of institutions has its own peculiar problems that do not seem to go away or to get solved by any time-honored management strategies. Their problems continue unresolved because their situations are continually changing at a rate beyond the logical comprehension and control of conventional methodology.

The time has come for all institutions which face crises that stem from advances in the physical sciences to introduce scientific methods in an effort to meet the unprecedented need for informed management. These needs should be paramount in the present era. This is especially true as they relate to the process whereby decisions are made and acted upon in both public and private organizations.

There is an apparent need in business organizations today to clearly understand the decision-making process. This understanding

should include more than management theory. It should involve the operational logic of the system which becomes the "decision process."

The struggle for the survival of our society is probably more apparent when one examines the literature in the social sciences. On the basis of current events alone one can hardly doubt the state of disrepair and revolutionary characteristic of our social systems. Objective consideration of the hard facts lead one to conclude the need for new knowledge in relation to decision-making is not only obvious, but mandatory.

According to Geoffrey Vickers (32), "Rapid Industrialization wherever it occurs, releases into the system an ever greater degree of change and hence of disturbance. The volume of this disturbance, unless controlled, is bound to grow more rapidly than the adaptability of the society and must threaten the society with one or both of two related dangers. One danger is that the society may fail to adapt itself to the changes and break down. The other is that society will adapt itself only at the cost of some major and adverse change in valuation. In fact, it may be able to survive only by the sacrifice of values which today it rightly deems essential. Either of these dangers is a threat to the well-being of individual men and women."

In summary he states "the present and immediate past do not provide evidence from which the future can be predicted, either for your country or for any other. The rate of industrialization rises automatically at an accelerating rate unless it is limited either by deliberate policy or by its own effects, and it evokes new responses as it passes new thresholds.

We can count its' blessings and its' banes, but we cannot strike a balance which has forecast its results by deepening our understanding of the systems (international, national, social, and personal) which its impact disturbs; of the ways in which such systems are bound to respond; and of the extent to which they are free to choose between these ways of responding. Our understanding of these processes form the essential background to any discussion of industrialization."

An understanding of the systems concept is fundamental to the decision process. This is echoed by all modern authorities when refering to current problems.

The challenges to the counselor are many and profound. He must possess the ability and skill to enter into the individual counselee's frame of reference. He must be able to understand the counselee's logic regardless of whether he is considered normal or abnormal. This can only be done within the concept of how the counselee's individual logic relates to the logic of the system in which he operates.

This requires the counselor to have more than a knowledge of socio-economic levels or race distinctions. He must have a knowledge of group logic as it relates to the environment. For example, it is not enough to understand the cultural differences between the black and white, the counselor must understand the logic of the individual as it relates to his color and to his environmental structure such as position and social status.

The counselor must understand the logic of the group that he is operating within and its relationship to a multitude of environmental factors. If he is going to be adequately trained in systems theory, he

must be helped to understand how systems logic applies to the many fields and disciplines. The application of such an approach should make it possible for the individual to broaden his horizon of expectation and to increase his productivity in terms of self-actualization and goal attainment.

For TGISS, it is proposed that game models be constructed to teach systems logic and concepts. Systems logic must be understood in terms of systems concepts and constructs. For example -- a game using a business organization as the model not only must provide instruction about systems logic, but must provide instruction about vocational concepts and the interpersonal relations concepts through which the systems logic tends to operate.

Vocational concepts would include such concepts as job mobility, entrance requirements, salary scale, open-end and closed-end job descriptions, job flexibility, profit and loss, success probabilities, profitable level of productions, hidden costs, tax structures, and many others. These concepts must be incorporated in the game in order to develop within the student an understanding of the concepts and their interrelationships within the economic system. By providing the student with a chance to experience these concepts it gives the student an opportunity to experience how his own personality might be in agreement or in conflict with the vocational constructs he is likely to deal with in the future. An example might be that insight can be gained relevant to the student's need to control his ability to lead, to organize, to communicate, and his tolerance for ambiguity, failure and perfectionism, etc.

Criticisms have been directed toward this type of approach by some individuals insomuch as they feel game theory tends to teach logic

that is devoid of morality and values. However, it would seem that herein lies the major value of the gaming approach.

The gaming approach emphasizes the responsibility of the individual in constructing his personal value and moral system in relationship to his environment. It forces him to inject his own values into the game situation and at the same time gives him an opportunity to view the value system of other participants. For example, as the game progresses the groups are given the opportunity to evaluate the game situation such as cooperation versus non-cooperation. At this point in the game the student will be given an opportunity to discuss the game procedure in relationship to his own value system.

By following this type of game strategy the student will be placed into the position of developing his own value system. The strategy will also tend to clarify that systems have no morality independent of people and their utilization of the system.

The value and applicability of the systems approach has long been recognized in the physical sciences. Recognition of value has also been given in the social sciences even though proper utilization has been lacking. Learning games based upon systems strategies has not been fully understood in the field of education. The difficulty may perhaps be a result of an obvious neglect of broad-base research in the area. People do not tend to connect reality with games or with enjoyment. The fact that all experience is reality is a concept that eludes many individuals. One would not ordinarily expect to learn exactly how to behave on a job by playing a vocational game.

It is not the function of the game to code, predict, or control behavior. The function is to teach systems logic and concepts much in the same way that war games are designed to teach battle logic. It should be emphasized that the function is not to rehearse a set of predicted responses or to manipulate human behavior through a predetermined set of stimuli.

When one analyzes the games of small children he finds these games are modeled after environmental logic which constitute reality experiences for the children. Games promote positive and negative values. There can be little doubt that games constitute learning experiences.

Every child should be provided with the opportunity to react freely with his environment. The fact remains that a person is a "velocity" system. However, this concept remains widely misunderstood and commands little appreciation.

Life on earth depends upon the velocity and movement of our planet. So it is that the life of an individual is dependent upon his velocity. A living human organism will happen, he will experience, he will have velocity.

The velocity of the individual will not be turned off as a result of environmental failure to give him the opportunity for meaningful expression. It will merely redirect the velocity and increase the probability of non-productive movement.

The utilization of game models will provide increased opportunities for the student to engage in meaningful experiences. In an effort to provide added opportunities for the student to engage in these experiences it is vital that schools start serious utilization of game models.

Present-day schools cannot afford to refuse to apply any reasonable technique in their efforts to help youngsters expedite self-actualization. To do so would constitute the greatest prostitution of social justice of the twentieth century.

On the basis of a review of the literature it has been determined that many successful applications of games and simulation models have been made. Some of the problems were related to model utilization in the area of vocational development. According to business executives, at least half their problems are related to motivation. Motivational problems continue to be important in industry. They are equally important in an educational sense. Therefore, many of the models used in industry are applicable in an educational environment with little or no change.

According to Prosad (18):

> "The problem of modeling is another important area since the results of simulation are no better than the model provided. A model provides a formal statement of system behavior. The model may be symbolic, mathematical, or merely descriptive. The model should be constructed so that the parameters, variables, and forcing functions correspond to the actual system. The parameters should include properties which are sufficient to define the behavior of the system; whereas the variables are the quantities which describe the behavior for a given set of parameters. The forcing function provides the stimulus external to the system which causes the system to react. For example, job orders which enter a production system, cause men to work, machines to run, etc. In this way, job orders become the forcing function for the system. Whatever particular form is used, a model provides the frame of reference within which the problem is considered.
>
> A model often indicates relationships which are not otherwise obvious. However, a model need not duplicate actual conditions to be useful. The model should be designed to predict actual behavior resulting from changes in the system design or application of new decision rules. Prediction

implies an understanding of the manner in which the system reacts; that is, being able to specify the outputs for a given set of inputs. This approach differs from the conventional concept of the 'black box.'

Models are merely the basis for testing new ideas and should not become ends in themselves. The more simple the model, the more effective it is for simulation purposes. Tests should be made prior to model building to determine the sensitivity of the characteristics which are incorporated. Typically, certain key characteristics contribute the majority of the information to be derived from simulation. Many of the other characteristics, although more numerous, do not contribute much to the final systems design. It is imperative, therefore, that a representative sample be taken rather than an exhaustive sample. To this end, the number and type of characteristics to be included should be carefully selected.

One approach is to start with a simple model which can be easily modified to incorporate new factors or to eliminate undesirable ones. Starting with paper and pencil models often helps to clearly define the problem and specify the system design. Conventional flow charting can be used to obtain information with which to start the study. These data can be refined and expanded as the model develops. At the completion a 'logical model' is available which should appropriately describe the system characteristics.

> The major task of simulation is reached at this point. The logical model, which is merely descriptive, is not suitable for computer simulation. The model must be modified to suit the particular computer on which it will be programmed. Factors such as kind of memory, manner of indexing, speed of computation, and errors due to rounding must all be taken into account. Simplification is often necessary due to speed of computation or limitation of the computer memory. The method of filing information and representing time are also significant problems. Which data to accumulate and at what point in time often are difficult to decide beforehand. Thus, the program must be flexible and easy to change."

TGISS will include some basic game models. Initial designs will include simple models which can be easily modified. Increased levels of game complexity will be added to the system capability as the total system is upgraded. Complexity levels will be somewhat determined by hardware-software constraints and conceptual limitations.

The following steps will constitute a set of procedures in the game development process.

1. Establish the criteria for evaluation and selection of data to be included in the game model.
2. Develop the preleminary approach to the game.
3. Determine the uses of the game.
4. Estimate utilization costs.
5. Determine the group applications of the game.
6. Establish evaluation strategies.
7. Test and check out the adequacy of the game.
8. Develop in-service training guidlines for game utilization.
9. Full utilization of model.

The design and implementation of game models would of necessity be accomplished in stages according to level of complexity. Software development can be expected to become more difficult as the game concept becomes more complex.

Vocational gaming in a system such as TGISS would have to be accomplished through the integration of a large number of interrelated models to provide the following advantages.

1. Flexibility in scheduling.
2. Conceptual instruction of system interrelationships and system complexity.
3. Wide choice of activities for student participation.
4. Ease of curricular adaptation.
5. Time for intellectual growth between game steps.

Figures 1, 2, and 3 provide a prototype of one total model complex.

Figure 1
SUGGESTED FIRST STAGE OF GAME MODEL DEVELOPMENT

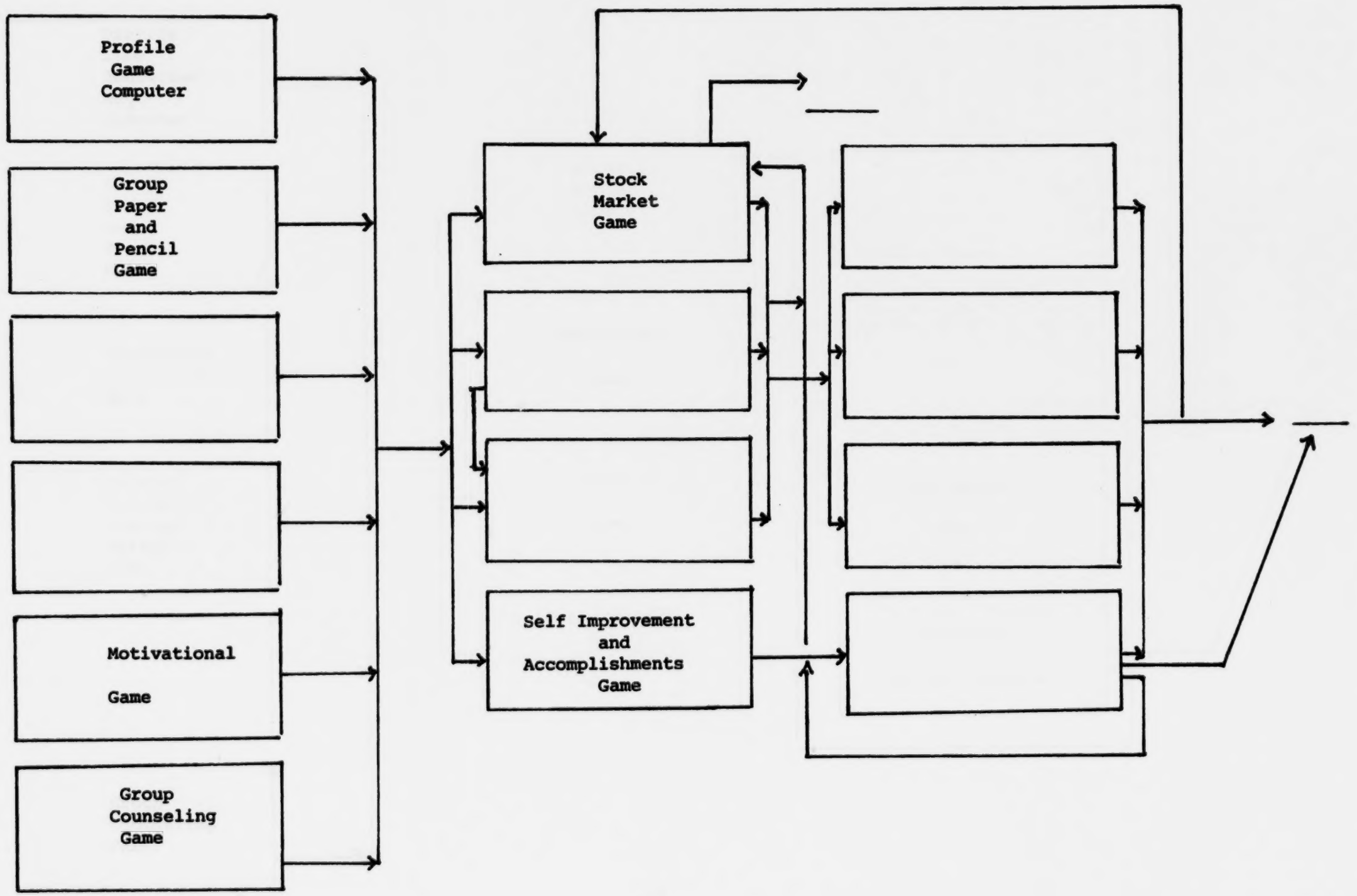


Figure 2
SUGGESTED SECOND STAGE OF GAME MODEL DEVELOPMENT

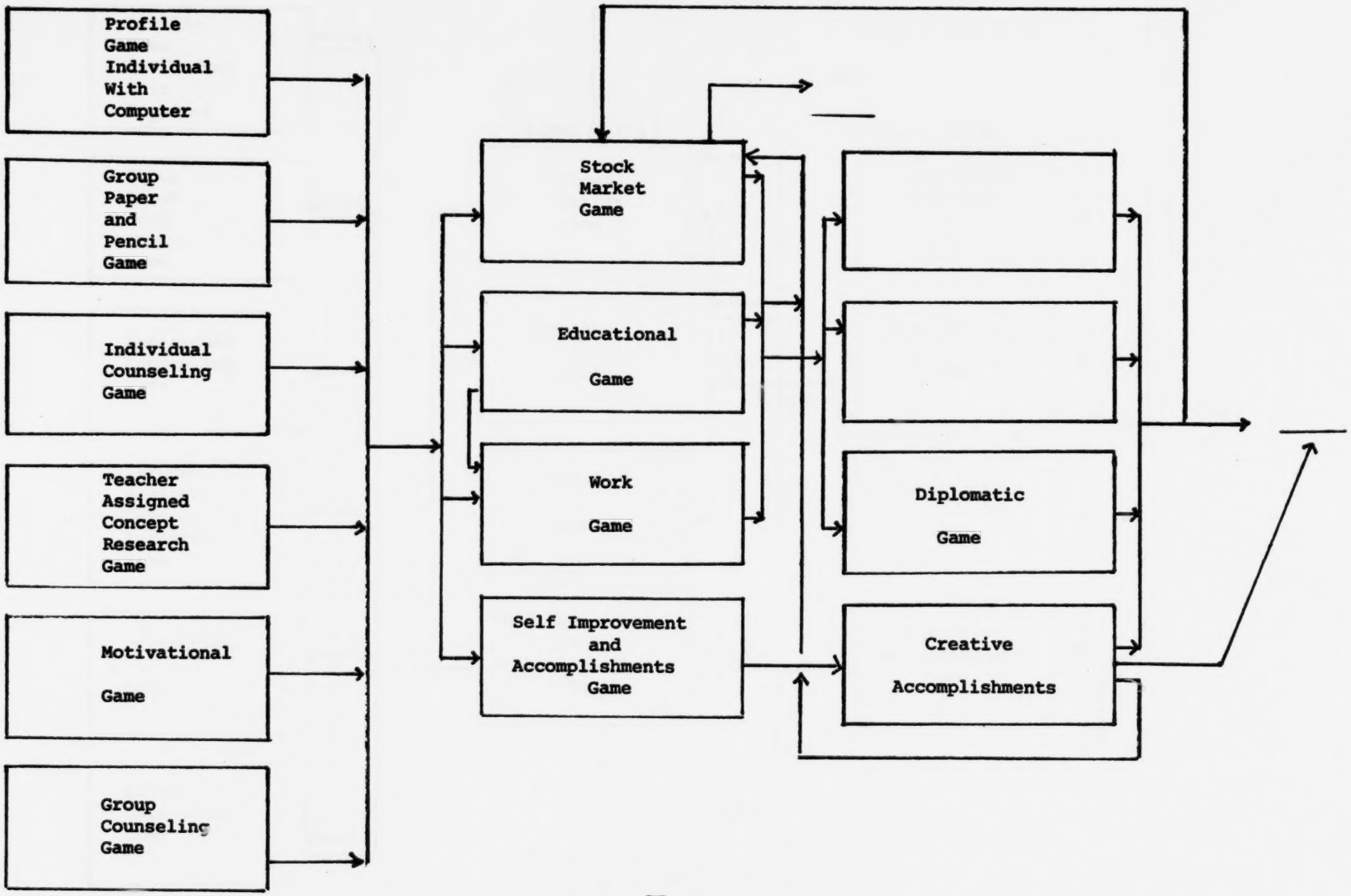
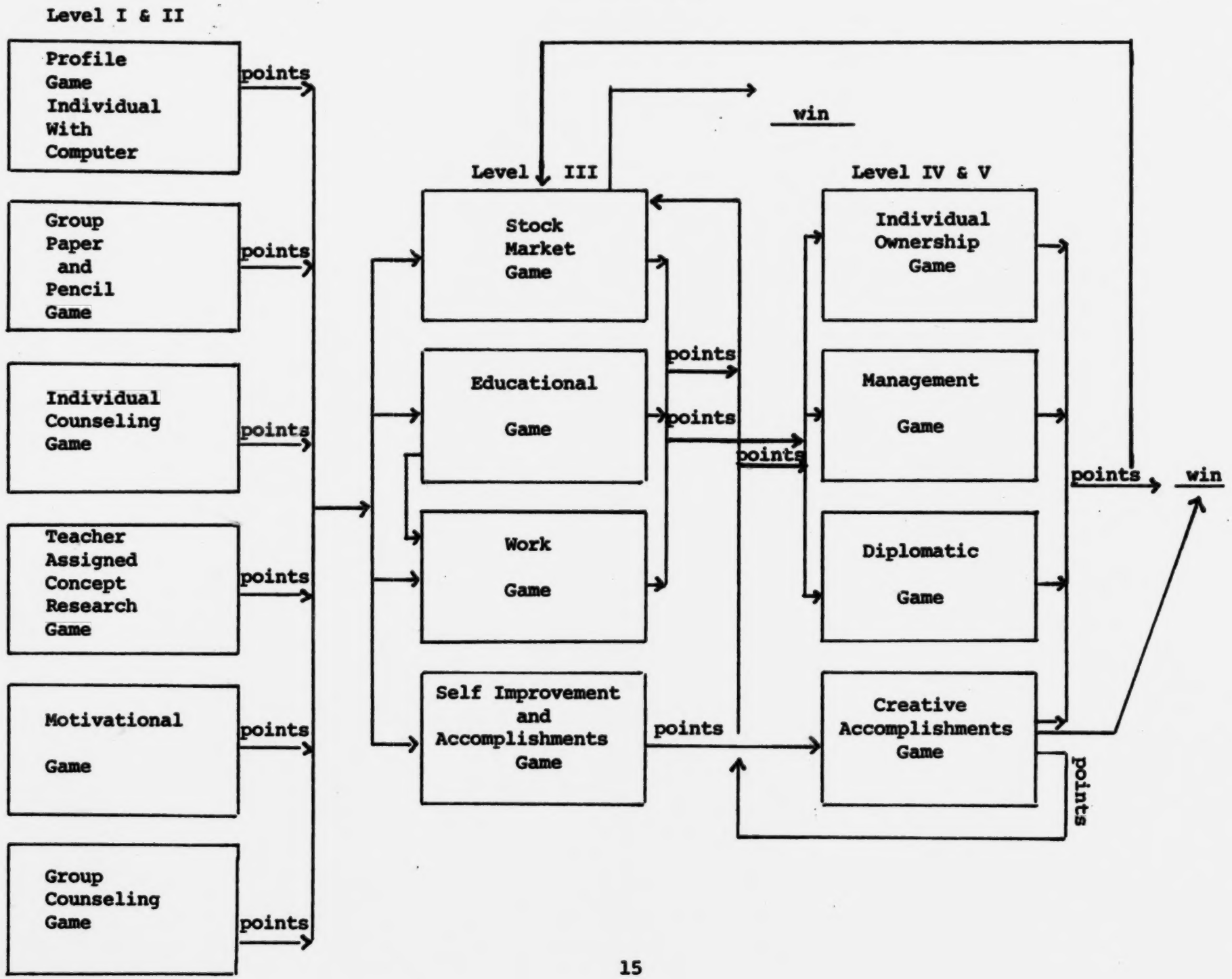


Figure 3
TOTAL GAME MODEL



OUTLINE OF THE TOTAL MODEL STRUCTURE

Profile Game:

In this game the student should be able to select a vocational objective at random on the computer. The computer would then ask the student about the profile of the occupation. The student must give a correct profile in order to win points. The computer would give the right answer to each question the student answers incorrectly in order to teach profile concepts to the student. This type of game would develop the student's thinking in terms of equating traits with occupations and at the same time would give information about occupations in a game setting.

Points can be applied to the **next** level of gaming. Some of the dimensions a student would try to match with a given occupation would be:

1. I. Q.
2. Wages (entrance), wage average.
3. Factors from Kuder Preference Pattern.
4. Entrance requirements.
5. Geographical Distribution.
6. Gillford Zimmerman Personality Factor.
7. Type of institution and training of a majority of the workers.
8. Physical requirements.
9. Job mobility.

Group Paper and Pencil Games:

The number of games that can be developed here are numerous. These can easily be developed in relation to the total curriculum and applied to the classroom. Scores can be stored in the computer for each

individual even though these are group games. Points may be used at the next level of gaming.

Individual Counseling:

Many students would like individual counseling in order to facilitate personal growth but do not want to be labeled problem students. Students could enter counseling from a game concept in order to facilitate personal growth and to gain points for the total game play. This type of approach should be well organized in order to show movement. This could be accomplished by having Personal Decision Workbooks. Students would be able to develop information in relation to personal decisions, over a set period of time. One of the personal decision games currently on the market could be used in the beginning development stages of the counseling approach.

Teacher Assignments:

In co-operation with the Guidance Program, extra assignments relating to the Guidance Program and the Curriculum could be used to accumulate points (all points for all games to be computer scored). It is important that definite concepts be developed. With the use of this approach, research concepts dealing with the use of the library could adequately be developed as well as other system concepts. This approach would probably not be successful if the points were given just for extra work. Definite concepts that are known to the students and teacher would have to be developed. A test for the concepts could be computerized. The student could be encouraged to play games with the computer as a felt need becomes apparent.

Motivational Game:

These models could be constructed around study habits and remedial work depending upon the needs of the students. In the first stage of development there would be orientation type group procedures. Under the motivational game would fall the individual self-improvement area. This concept is important in trying to reach the devient in the Educational System. In the first stage the individual would follow a planned program of self-development or accomplishment with an outline of information needed for the planned development. This would have to be done in connection with a sponser either in or out of the educational environment. For example, a student may be interested in creative writing; therefore, the student would arrange for an English teacher to be a sponser. The student and teacher would outline a sequence of research for the student as step one. This model approach has the advantage of reaching the student most often who does not wish to participate in group activities and who is therefore left out of many school activities. It should be noted that it would not be in the interest of the program to count the normal-average extra curricular activities such as sports in this concept. If the faculty decides they should include the extra curricular activities into the game model, they should probably be included in a separate category.

Group Counseling:

Much the same rationale behind the individual counseling as given in area three would apply to group counseling. In fact, it may not be feasible to include the game concept with individual counseling as this might make individual counseling so popular there would not be enough personnel to handle the program.

Group counseling, to be in keeping with the model concept, should have stated concepts that are to be dealt with. These concepts should be outlined in relation to goals and the time spent. In so far as scheduling is concerned probably all models should be scheduled on a semester basis. The goals of group counseling would more or less center around group process in terms of self-development.

Extra Curricular Activities;

Probably community pressure will demand these activities be incorporated into the total model. This could have positive influence if kept in proper perspective. Fewer points should be given for this type of participation as this type of activity tends to be its own reward. However, an individual who gains points from this activity might be motivated to participate further in the other activities of the model.

Scoring:

Number of points per activity would be determined proportionately to the number of activities the individual participates in. This would mean the more activities a pupil participates in, the fewer points he would receive for a single activity. However, the more activities he participates in the better his chances to accumulate a higher overall score.

Playing with points at stage two in the model:

In this first implementation stage the game possibilities with the accumulated points will have to be limited. As a result, students would be able to use their points to play a computer game - probably as a member of a group. An appropriate game would be a computerized stock

market game that is currently on the market. Points would be exchanged for stock buying power, and the group would then decide what moves to make in relation to the stock market game which would be fed into the computer. The stock market game could be played in relation to other groups. Therefore, an English class could challenge other English classes. Duplication of group membership could be avoided by limiting the participation to one class period of the day.

In the initial stage of implementation, individuals will be able to play as an individual with an individual pay-off. In the implementation of the second level of development a student could use points to participate in other games that would not be as speculative as the stock market game.

Pay-off:

In order to motivate students to participate, the system model should have a pay-off. The pay-off should be selected for its psychological value. A group pay-off could be in the nature of a special group activity such as a class picnic, etc. Individual pay-off could be in candy bars; special opportunities to attend plays, etc. The value of the pay-off is not as important as the pay-off concept. Whether or not we are in agreement, the vocational world is organized in relationships to pay-off in power and money. Recognition is a result of power or money pay-off and is important, but some value then should be given as a pay-off to be in keeping with vocational reality.

Service activities are paid off in terms of recognition. The game model is organized primarily around vocational concepts and should therefore not avoid the pay-off concept even though it is a token. An

individual's capacity for service is usually connected with his occupation which makes the occupational pay-off concept meaningful in terms of service.

LEVEL III GAMES

All points accumulated in level I and II games may be used to play any game in level III.

In the second stage of implementation the level III games would be developed. These are primarily SUM-0 games where the individual or group either wins or loses.

Stock Market Game:

This game has already been described in the level I and II game in the initial stage of implementation. This is a computer game where points may be used. This would be a high speculation game. The pay-off would be higher than other games, but the risk would also be very high. The concept of chance would be highlighted by this game as well as the conservative approach in relation to the daring approach.

Educational Game:

This game may be chosen in order to gain points to use in the game progression. The educational game would allow the student to select a profile or series of profiles at random selected by the computer. The student would then have to make decisions relating to the education of the individual. If the student can win enough points, he can enter the management game in level IV and V as this requires more points than the individual ownership game. The individual ownership game has a higher pay-off, but a much higher risk. Risk of failure would be 75%.

If the student does not like the profile of the educational game, he may use the profile to play the work game. More points will be given for the educational game, but the work game will have a higher rate of success.

Points at any time could be used to play the stock market or held in reserve as a result of a bad decision or some unforeseen circumstance.

The Work Game:

The work game will cost fewer points to play than the educational game, but the pay-off will be less and the chance of winning greater. The student would be given a job profile at random and play an occupation in relationship to work and personal decisions.

Self-Improvement Game:

The student who follows the self-improvement model may use any of his points to play the other games at any time. He is given points if he proceeds in his individual endeavor. However, the only way he can get a pay-off is to use the points in the other parts of the system. There is a very important lesson to learn here for the individualist. Although he can withdraw into his own individual endeavor, he must come back to the system for a pay-off. At this point, if he feels he can be creative, he may invest his points in level IV and V. If he wins some type of competition for his creative ability, he is given a high pay-off by investing his points in the creative game or he can play it safe by investing his points in the other games. This type of pay-off demonstrates to the student the high value of creativity, but also the problems associated with winning a pay-off in this area.

LEVEL IV AND V GAMES

These are group games and must be played in a group with the exception of the creative game.

The Individual Ownership Game:

This game is a strategy game played by a group of individuals. Some of these types of games are already on the market. One such game is the Inter-Nation Simulation Kit, published by S. R. A. and is possibly adaptable for computer use.

In the individual ownership game a student would select a position by drawing lots with other members. Each member would have to make business decisions designed to teach business concepts. These decisions would be fed into the computer for scoring for each successive step. Pay-off would be high, but failure would also be high.

The Management Game:

This game would allow students to select a job in a business organization by drawing lots. The group would then make business decisions which would be scored by the computer. Pay-off would be lower than in other games, but the chance of winning would be high.

Diplomatic Game:

This game, published by S. R. A. would be suitable for this area of gaming and should be referred to here.

Creative Game:

This level of the game has already been mentioned. In order to win at this level, the student must have won in competition of some

type, such as an essay contest, art contest, etc. The level of competition will decide how many points pay-off. However, in order for the student to get a final pay-off, he must go back to the system. He may play one of the other level IV or V games or he may select a participant in the management game to represent him. If their pay-off is high in the creative game, they would not be required to use all of their points and thus, would be assured of some pay-off. They could use all of their points if they wanted to and play all of the level IV and V games as well as the stock market game; and, there is the possibility of winning all.

Winners of level IV and V games may use points for pay-off or to re-enter games at level III or to play the stock market.

As games are extended they become extremely complex and difficult to integrate into the system. However, the present-day state of the art should allow for such development in education. Certainly, the opportunity to provide such a capability should not be passed over lightly in man's efforts to improve public education.

One of the myths of public education has been the sheltering of young people from confrontation with the facts of life. These facts include those concepts related to work, productivity, pay-off, failure, success, social commitment, and self-satisfaction with life in general.

The difficult task of providing American youth with opportunities to become vocationally aware will not be achieved if youngsters are never confronted with decision problems and provided with the opportunity to think for themselves. The day of "tell me about it" education is as obsolete to education as the ox and cart are to transportation. Gaming for simulated confrontation with real world problems is at least one approach to overcoming such obsolescence.

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